21LR8

High-Mu Triode—Beam Power Tube

NOVAR TYPE

For Combined Vertical-Deflection Oscillator and Amplifier Service in Color TV Receivers

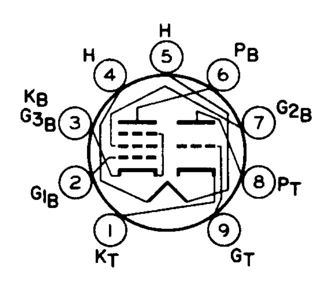
ELECTRICAL CHARACTERISTICS

Bogey Values

Heater Current	I_f	450	mA
Heater Voltage (AC or DC) at I_f = 450 mA .	E_f	21.0	V
Heater Warm-up Time (Average).		11	s
Direct Interelectrode Capacitances (Approx.)			
Without external shield			
Triode Unit:			
Grid to plate.	c_{gp}	6.0	pF
Input: G_T to (K_T, H).	c_i	6.5	pF
Output: P_T to (K_T, H)	c_o	1.6	pF
Beam Power Unit:			
Grid No.1 to plate	c_{gp}	0.7 max	pF
$G1_B$ to (K_B + $G3_B$, $G2_B$, H).	c_i	16.0	pF
P_B to (K_B + $G3_B$, $G2_B$, H).	c_o	9.0	pF
$G1_B$ to P_T.		0.12 max	pF
P_B to P_T		0.32 max	pF

Basing Designation for BOTTOM VIEW 9QT

Pin 1 – Triode Cathode
Pin 2 – Beam Power Grid No.1
Pin 3 – Beam Power Cathode & Grid No.3
Pin 4 – Heater
Pin 5 – Heater
Pin 6 – Beam Power Plate
Pin 7 – Beam Power Grid No.2
Pin 8 – Triode Plate
Pin 9 – Triode Grid



CLASS A_1 AMPLIFIER

For the following characteristics, see **Conditions**

		Triode Unit	*Beam Power Unit*			
Amplification Factor	μ	58	-	-	6.5[a]	
Plate Resistance (Approx.)	r_p	16000	-	12000	-	Ω
Transconductance . .	g_m	3600	-	9300	-	µmhos
DC Plate Current . .	I_b	2.3	200[b]	56	-	mA
DC Grid-No.2 Current	I_g	-	20[b]	3	-	mA
Cutoff DC Grid-No.1 Voltage						
I_b = 10 µA.	$E_{c(co)}$	-6.6	-	-	-	V
I_b = 1 mA (Approx.)	$E_{c(co)}$	-	-	-26	-	V
I_b = 100 µA	$E_{c(co)}$	-	-	-30	-	V

Conditions

		Triode Unit	Beam Power Unit			
Heater Voltage	E_f	21.0	21.0	21.0	21.0	V
Plate Voltage	E_b	250	45	135	120	V
Grid-No.2 Voltage	E_c	-	125	120	120	V
Grid-No.1 Voltage	E_c	-4	0	-10	-10	V

MECHANICAL CHARACTERISTICS

Operating Position . . . . Any
Type of Cathodes . . . . Coated Unipotential
Maximum Overall Length (l_m) . . . . 3.710 in
Maximum Seated Length (l_m) . . . . 3.330 in
Length, Base Seat to Bulb Top
(Excluding tip) . . . . 2.810 to 2.990 in
Diameter (d) . . . . 1.438 to 1.562 in
Envelope T12
Bases (alternates)
Small-Button Novar 9-Pin (JEDEC No.E9-76)
Small-Button Novar 9-Pin with Exhaust Tip 9-Pin (JEDEC No.E9-88)

VERTICAL-DEFLECTION OSCILLATOR *(Triode Unit)*

Maximum Ratings, Design-Maximum Values

For operation in a 525-line, 30-frame system

DC Plate Voltage	E_b	400	V
Peak Negative-Pulse Grid Voltage	e_{cm}	400	V
Peak Cathode Current	i_{km}	105	mA
Average Cathode Current	$I_{k(av)}$	30	mA
Plate Dissipation	P_b	2.5	W
Peak Power Output	P_o	2.5	W

Maximum Circuit Values

Grid-Circuit Resistance	$R_{g(ckt)}$		
For grid-resistor-bias operation		2.2	MΩ

VERTICAL-DEFLECTION AMPLIFIER *(Beam Power Unit)*

Maximum Ratings, Design-Maximum Values

For operation in a 525-line, 30-frame system

DC Plate Voltage	E_b	400	V
Peak Positive-Pulse Plate Voltage[c]	e_{bm}	2500[d]	V
DC Grid-No.2 (Screen-Grid) Voltage	E_c	300	V
Peak Negative-Pulse Grid-No.1 (Control-Grid) Voltage	e_{cm}	250	V
Peak Cathode Current	i_{km}	260	mA
Average Cathode Current	$I_{k(av)}$	75	mA
Plate Dissipation[e]	P_b	14	W
Grid-No.2 Input[e]	P_c	2.75	W
Envelope Temperature	T_E	210	°C

MAXIMUM CIRCUIT VALUES

Grid-Circuit Resistance	$R_{g(ckt)}$		
For fixed-bias operation		1	MΩ
For grid-resistor-bias operation		2.2	MΩ

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[a] Triode connection.

[b] This value can be measured by a method involving a recurrent wave form such that the plate dissipation and grid-No.2 input will be kept within ratings in order to prevent damage to the tube.

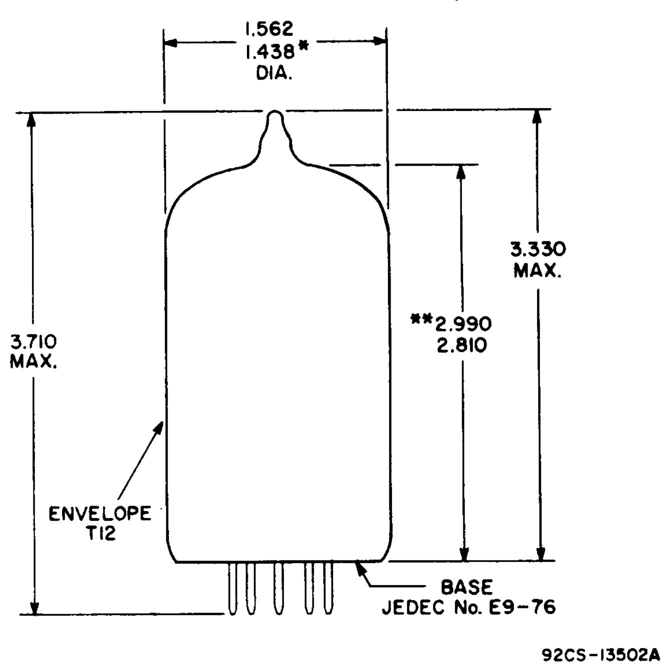
[c] This rating is applicable where the duration of the voltage pulse does not exceed 15 per cent of one vertical scanning cycle. In a 525-line, 30-frame system, 15 per cent of one vertical scanning cycles is 2.5 milliseconds.

[d] Absolute Maximum value.

[e] An adequate bias resistor or other means is required to protect the tube in the absence of excitation.

DIMENSIONAL OUTLINE

Top Exhaust (JEDEC No. 12-65)



DIMENSIONS IN INCHES

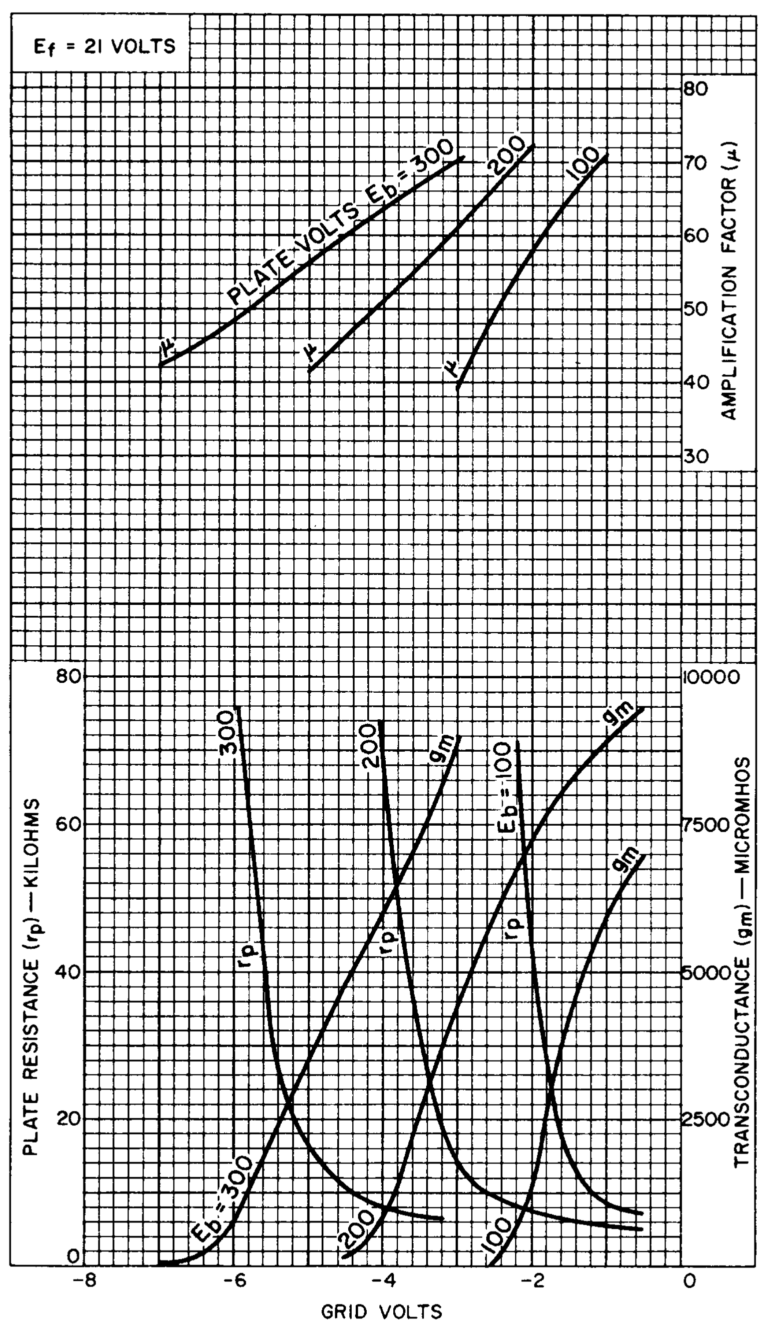
Bottom-exhaust version has the same dimensions for maximum overall length and seated length as the top-exhaust outline shown.

* Applies to the minimum diameter except in the area of the seal.

** Measured from the base seat to bulb-top line as determined by arcing gauge of 0.600" I.D.

Typical Characteristics

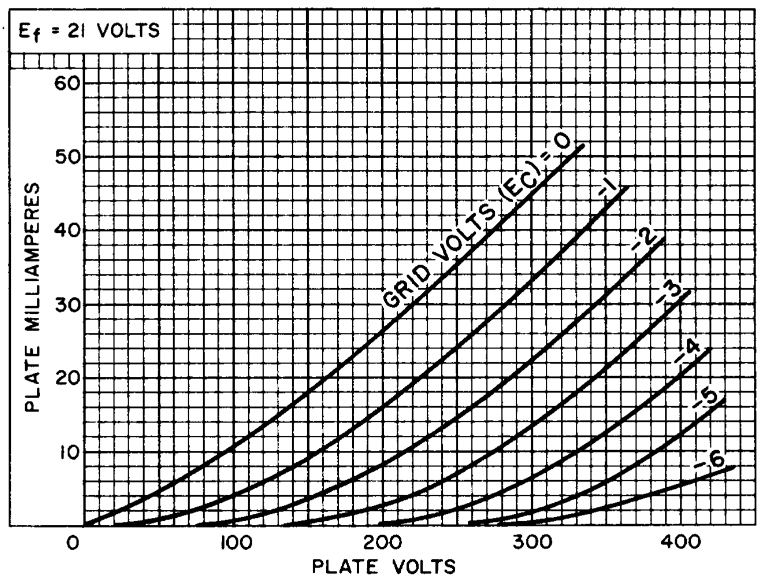
Triode Unit



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Typical Plate Characteristics

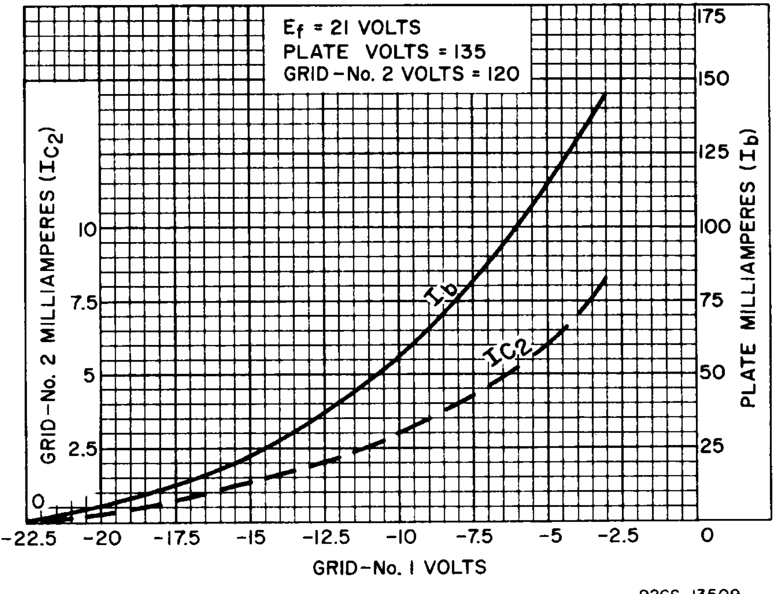
Triode Unit



92CS-13508

Typical Characteristics

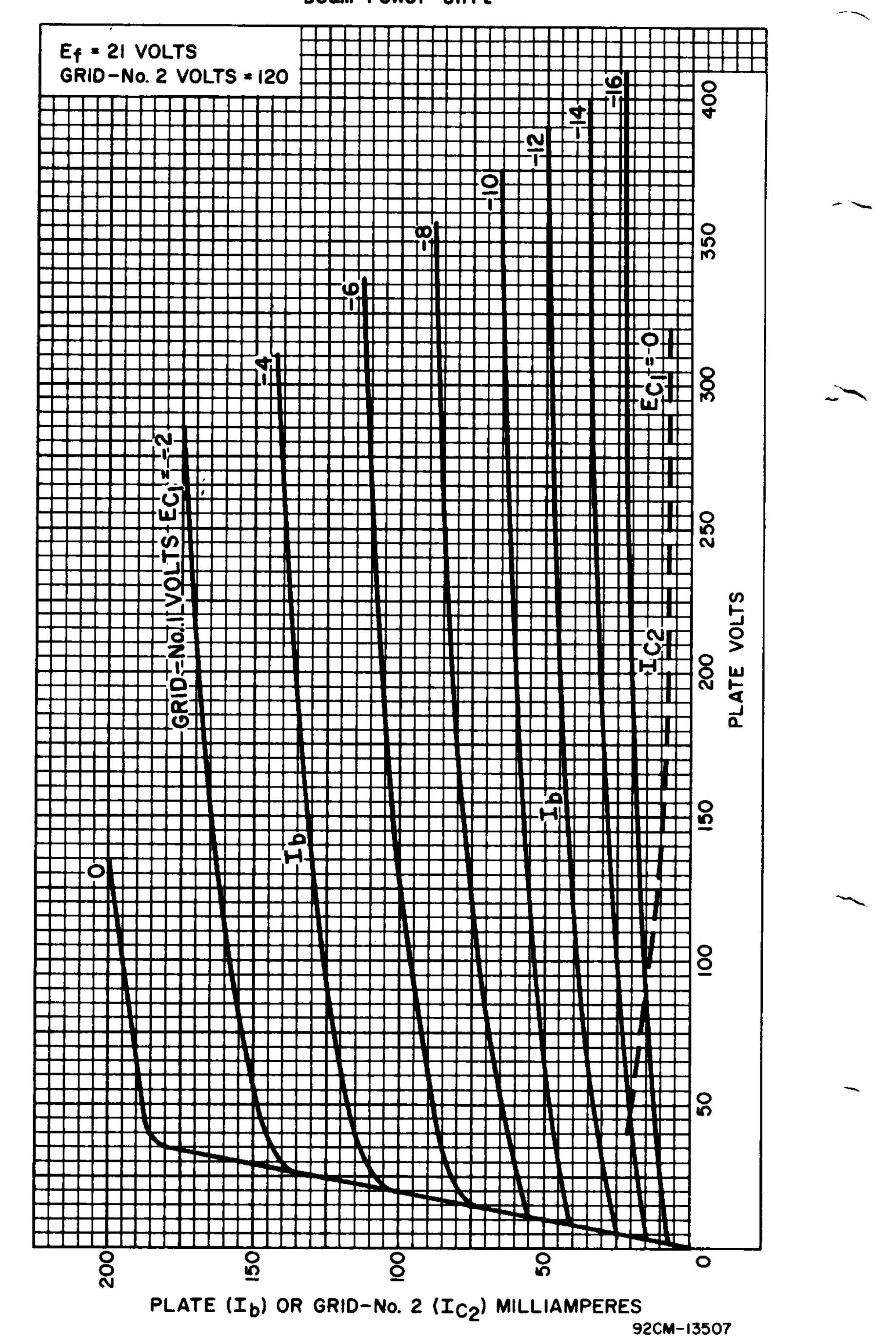
Beam Power Unit



92CS-13509

Typical Characteristics

Beam Power Unit



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